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10/635,676	08/07/2003	Jota Fukuhara	04329.3109	1779

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EXAMINER

BLUM, DAVID S

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 10/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/635,676

Applicant(s)

FUKUHARA ET AL.

Examiner

David S. Blum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,6-8,10,11 and 13-26 is/are pending in the application.
4a) Of the above claim(s) 13-26 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,2,4,6-8 and 10 is/are rejected.
7) ☒ Claim(s) 11 is/are objected to.
8) ☒ Claim(s) 1,2,4,6-8,10,11 and 13-26 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 07 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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This action is in response to the amendment filed 8/17/05.

DETAILED ACTION

Response to Amendment

1. The amendments to the claims recites, "Please cancel claims 12, 14-18, and 26-29, without prejudice or disclaimer of their subject matter, amend claims 19 and 23, and add new claims 30-42, as indicated below. This listing of claims will replace all prior versions and listings of claims in the application:". However, the listing of the claims does not cancel claims 14-18 and 26 (listed as withdrawn), claims 27-29 did not previously exist to be canceled, claims 19 and 23 have not been amended (also listed as withdrawn) and there are no new claims 30-42.

The claims have been examined according to the current listing.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-2, 4, 6-8, and 10-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 (and thus all dependent claims) limit the first insulating

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film to containing no hydrogen. How this is achieved is not taught in the instant specification. The applicant points to page 6 for support, and although the specification on page 6 recites "no hydrogen", the specification teaches that one can test for hydrogen using HFS (hydrogen Forward Scattering). HFS (Charles Evans and Associates) has detection limits for hydrogen at 0.1 atomic percent. Therefore, a silicon oxide layer may have 0.1 % hydrogen and not be detectable by this method. Therefore, the instant application does not teach "no hydrogen" but rather a hydrogen level undetectable by a test with detection limits of 0.1%.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Katsumi (JP 11-074472) with Charles Evans and Associates as evidence of inherency. Katsumi teaches all of the positive steps of claims 1 and 6-7 as follows.

Regarding claim 1, Katsumi teaches forming a wiring layer (40) and a first insulating film (42) on the wiring layer in a plasma of not more than 1% hydrogen in all gasses

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(paragraph 0047, SiH₄ about 1% and NH₃ about 5%, to total about 6%, results in about 1% total hydrogen in all gasses).

Regarding the limitation of the layer containing "no hydrogen", Katsumi teaches the method of the instant application (less than 1% hydrogen in the plasma) and reports a resultant hydrogen content in the film of 1×10^{-22} (or 0.1%). As best understood by the examiner, this would be undetectable by the HFS method and therefore would be considered by the applicant as containing "no hydrogen". As the instant specification does not teach a method that would produce a hydrogen content that differs from Katsumi, and that both the instant application and Katsumi would produce a hydrogen level undetectable by the HFS method, it is inherent that Katsumi would produce a silicon oxide film of "no hydrogen" within the detectable limits of the HFS method.

Regarding claim 6, a second insulating is formed upon the first film in a plasma of not more than 1% hydrogen in all gasses (paragraph 0047, SiH₄ about 1% and NH₃ about 5%, to total about 6%, results in about 1% total hydrogen in all gasses). As there are no positive steps to differentiate the first film from the second film. The film of Katsumi is considered to be both the first and second film of the instant claim.

The mere duplication of parts, or in this case the duplication of process steps to form the duplicate parts does not represent novelty, but rather, once Katsumi teaches the process for forming the insulation (passivation) film, its duplication is obvious.

In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) (Claims at issue were directed to a water-tight masonry structure wherein a water seal of flexible material fills the joints which form between adjacent pours of concrete. The claimed water seal has a

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“web” which lies perpendicular to the workface and in the joint, and a plurality of “ribs” which are parallel to the workface, forming the following shape:

The prior art disclosed a flexible water stop for preventing passage of water between masses of concrete in the shape of a plus sign (+). Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.).

Further, it has been held that “[v]arying the details of a process, as by adding a step or splitting one step into two does not avoid infringement, where the processes are substantially identical or equivalent in terms of function, manner, and result. Universal Oil Products Co. v. Globe Oil and Refining Co., 322 U.S. 471, 61 USPQ 382 (1944); Ace Patents Corporation v. Exhibit Supply Co., 119 F.2d 349, 48 USPQ 667 (7th Cir. 1941); King-Seeley Thermos Co. v. Refrigerated Dispensers Inc., 354 F.2d 533, 148 USPQ 114 (10th Cir. 1965). Identity of the apparatus used for executing the processes is not material in itself. National Lead Company v. Western Lead Products Co., 324 F.2d 539, 139 USPQ 324 (9th Cir. 1963).” Excerpt from Matherson-Selig Co. v. Carl Gorr Color Card, Inc., 154 USPQ 265 (DC NIII 1967).

Regarding claim 7, the first and second films are formed by thermal CVD (paragraph 0046, plasma CVD is a thermal CVD).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsumi (JP 11-074472) with Charles Evans and Associates as evidence of inherency and in view of Wolf (pages 435 and 273-275).

Katsumi teaches all of the positive steps of claims 2 and 10 as recited above in regard to claims 1 and 7, except for the thickness of the gate insulating film and alternative methods for forming the layer as well as its forming temperature..

Regarding claim 2, Katsumi is silent as to the thickness of the underlying gate oxide (gate insulating film). Wolf teaches that gate oxides are becoming smaller, and that 5 nm (50 angstroms) is a typical gate oxide thickness (page 435).

Regarding claim 10, Katsumi is silent as to the temperature of forming the layer. Wolf teaches this to be about 300 degrees C. (page 274).

It would be obvious to one skilled in the requisite art at the time of the invention to modify Katsumi by using a typical gate oxide (gate insulator) thickness as taught by Wolf, and to use typical deposition temperatures rather than to spend research time and money to (re)develop what is known in the conventional art. Further, one of ordinary skill in the art would know to form a first layer by spin coating as taught by Wolf to be an art recognized equivalence to CVD with an added advantage of reducing the occurrence of voids and seams.

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8. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsumi (JP 11-074472) with Charles Evans and Associates as evidence of inherency and in view of Vossen (pages 178, 197, and 201)

Katsumi teaches all of the positive steps of claims 2-3 and 9-10 as recited above in regard to claims 4 and 8, except for alternative methods for forming the layer as well as its forming temperature.

Regarding claim 4, Katsumi teaches the insulating film on the wiring layer is formed by CVD. Vossen teaches this layer (a SiO₂ layer) may be formed by sputtering (page 197), sputtering yielding excellent film uniformity.

The examiner also notes that the instant specification teaches forming this layer by CVD, spin coating, and sputtering, without teaching any criticality among the methods of the Markush group.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions or of any unexpected results arising there from. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1515, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 8, Katsumi is silent as to the deposition temperature. Vossen teaches that sputtering is a cold deposition with the only heat being supplied by ion impact at the target. This is suggestive of room temperature deposition, thus the layer would be formed at not more than 450 degrees C.

It would be obvious to one skilled in the requisite art at the time of the invention to modify Katsumi by using sputter deposition as taught by Vossen to yield excellent film uniformity.

Allowable Subject Matter

9. Claims 11-12 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 11 (and thus its dependent claim 12) contain the limitation where the passivation (insulating film) is planarized, and a third insulating film is formed (in a plasma of not more than 1% hydrogen) on the exposed first film prior to forming contacts through the first and third film. Katsumi does not teach planarization. Wolf does teach planarization of the passivation layer, but does not teach forming an additional passivation layer on the first layer after planarization and before forming contacts.

Response to Arguments

10. Applicant's arguments filed 8/17/05 have been fully considered but they are not persuasive.

The applicant argues that Katsumi does not teach a film with "no hydrogen" as amended into the claims. Katsumi teaches a plasma with less than 1% hydrogen, but also reports a small amount of hydrogen in the film. However, the level reported by

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Katsumi is below the detection limits of HFS and therefore would contain “no hydrogen” by the instant specification.

The applicant argues in regard to claims 2 and 10, that neither Katsumi nor Wolf teach an insulating film containing “no hydrogen” as in claim 1. This argument is addressed above in regard to claim 1.

The applicant also argues that the examiner has not shown that one of ordinary skill in the art would have been motivated to combine Katsumi and Wolf. The applicant disagrees. The motivation may not be a reason that coincides with the instant specification, but reasons of economical savings are motivation to combine and use common practice.

The applicant argues in regard to claim 4, that neither Katsumi nor Wolf teach an insulating film containing “no hydrogen” as in claim 1. This argument is addressed above in regard to claim 1.

The applicant also argues that the examiner has not shown that one of ordinary skill in the art would have been motivated to combine Katsumi and Wolf. The applicant disagrees. The motivation may not be a reason that coincides with the instant specification, but reasons of economical savings are motivation to combine and use common practice.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (571)-272-1687) and e-mail address is David.blum@USPTO.gov .

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached at (571)-272-1702. Our facsimile number all patent correspondence to be entered into an application is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "David S. Blum", with a long horizontal flourish extending to the right.

David S. Blum

October 26, 2005